Nurses' Use of Hazardous Drug-Handling Precautions and Awareness of National Safety Guidelines

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Purpose/Objectives: To determine patterns of personal protective equipment (PPE) used by oncology nurses while handling hazardous drugs (HDs) and to assess knowledge of the 2004 National Institute for Occupational Safety and Health (NIOSH) Alert and its effect on precaution use.

Design: Descriptive, correlational.

Setting: The Oncology Nursing Society 31st Annual Congress in Boston, MA, in 2006.

Sample: 330 nurses who prepared and/or administered chemotherapy.

Methods: Nurses described HD safe-handling precaution use by self-report survey.

Main Research Variables: The availability and use of biologic safety cabinets and PPE.

Findings: Respondents were well educated (57% had a bachelor's degree or more), experienced ($\bar{X}$ = 19, SD = 10.2 years in nursing and $\bar{X}$ = 12, SD = 7.9 years in oncology), and certified (70%; majority OCN®). Forty-seven percent of respondents were aware of the NIOSH Alert. Thirty-five percent of all participants and 93% of nurses in private practice settings reported preparing chemotherapy. Glove use (95%–100%) was higher than that reported in earlier studies, and gown use for drug preparation (65%), drug administration (50%), and handling excretions (23%) have remained unchanged. Double-gloving was rare (11%–18%). Nurses in private practices were less likely to have chemotherapy-designated PPE available, use PPE, and use spill kits for HD spills.

Conclusions: Nurses have adopted glove use for HD handling; however, gown use remains comparatively low. Chemotherapy-designated PPE is not always provided by employers. Nurses lack awareness of current safety guidelines.

Implications for Nursing: Nurses must know about the risks of HD exposure and ways to reduce exposure. Employers must provide appropriate PPE and encourage its use. Alternative methods of disseminating safety recommendations are needed.

Hazardous drugs (HDs) are pharmacologic agents exhibiting one or more of the following characteristics: carcinogenicity, teratogenicity, genotoxicity, reproductive toxicity, or organ toxicity at low doses (American Society of Health-System Pharmacists, 2006). Most HDs are chemotherapy drugs used in the treatment of cancer, making occupational HD exposure a significant problem for oncology nurses. Nurses may be exposed to HDs during preparation, administration, or handling of patient excreta following their use. Such exposure has been linked to acute and long-term health effects, including acute symptoms, adverse reproductive outcomes, and an increased risk of cancer.

Occupational exposure to HDs may result in adverse health outcomes. Those effects are based on the inherent toxicities of the agents. Several published studies have demonstrated health risks for healthcare workers who were exposed to chemotherapy. The first was a small, controlled study in which the authors reported mutagenic activity in the urine of patients who received chemotherapy, as well as the nurses who administered it (Falck et al., 1979). The Ames test was used, which measures genetic mutations in bacteria following exposure to chemicals. Ninety percent of known carcinogens test positive on this tool (Polovich, 2003). The study demonstrated that handling HDs during administration resulted in drug absorption by the nurses.

Pharmacists and nurses have reported acute symptoms from HD exposure, such as skin irritation, sore throat, cough, dizziness, headache, hair loss, allergic reaction, diarrhea, nausea, and vomiting (Harrison, 2001; Kyprianou, Kapsou, Raftopoulos, & Soteriades, 2010; Valanis, Vollmer, Labuhn, & Glass, 1993a, 1993b). Adverse reproductive outcomes have been reported more frequently in HD-exposed as compared to unexposed healthcare workers. Those include miscarriage (Kyprianou et al., 2010; Martin, 2003), spontaneous abortions (odds ratio [OR] = 1.5–2.3) (Selevan, Lindbohm, Hornung, & Hemminki, 1985; Stücker et al., 1990; Valanis, Vollmer, & Steele, 1999), infertility (OR = 1.42–1.5) (Martin, 2003; Valanis, Vollmer, Labuhn, & Glass, 1997), longer time to conception (OR = 0.8) (Fransman et al., 2007); preterm labor (OR = 2.98), and preterm births (OR = 5.56) (Martin, 2003). Other documented effects of occupational HD exposure in nurses include DNA damage (Fuchs et al., 1995;